

Dilani Rathnayake, PhD

(Rathnayake Mudiyanseelage Dilani Chathurika)

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Key specialized areas	▪ Biochar, soil carbon dynamics, soil organic matter chemistry, stable isotope analysis, analytical and applied pyrolysis, waste valorization.
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Education	▪ Ph.D. in Bioscience Engineering - Department of Green Chemistry and Technology, Faculty of Bioscience Engineering, Ghent University, Belgium (2017- 2021) ▪ Doctoral training program (30 credits), Faculty of Bioscience Engineering, Ghent University, Belgium (2017- 2021). ▪ B. Sc. in Agricultural Technology and Management (First class honors) - Faculty of Agriculture, University of Peradeniya, Sri Lanka. (2013-2016)
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Research experience	May 2024 to April 2026 ▪ Postdoctoral researcher in Climate and Agriculture research group, Agroscope, Federal Department of Economic Affairs, Education and Research, Switzerland.
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Project: Assessing the long-term impact of different soil amendments on soil nitrogen use efficiency and preferential soil organic matter stabilization pathways

January 2022 to April 2024

- Postdoctoral researcher in the Environmental Analytics research group, Agroscope, Federal Department of Economic Affairs, Education and Research, Switzerland, and Ithaka Institute, Switzerland.

Projects: Assessing nutrient recovery, contaminants, and agronomic properties of biochars produced from mixed biogenic waste materials; Activation of biochar and its application in wastewater micropollutant removal; Assessing technical, economic, and ecological implications of animal manure pyrolysis; Reviewing the methodologies to quantify the field-applied biochar.

August 2023

- Guest researcher at Eawag- The Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland.

Project: Residual microplastic quantification in biogenic waste materials.

July 2017 – April 2021

- Ph.D. candidate, Department of Green Chemistry and Technology, Faculty of Bioscience Engineering, Ghent University, Belgium.
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Project: Use of biomass-derived carbons (BCs) and BC-derived products for soil amendment and in soilless growing media.

- Visiting Ph.D. student at the UK Biochar Research Centre, University of Edinburgh, United Kingdom.

Project: Assessing nutrient recovery, contaminants, and agronomic values of biochar produced from various waste biomass under different pyrolysis conditions and scales.

August, 2020

- Guest researcher at the Institute for Materials Research, Hasselt University, Belgium.

Project: Analysis of polycyclic aromatic hydrocarbons in biochars.

January, 2017- March, 2017

- Voluntary research assistant – Department of Soil Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka.

Project: Isolation and characterization of phosphorus-solubilizing bacteria in paddy growing soils in Sri Lanka.

January 2016 – December 2016

- Final year Undergraduate research project, Faculty of Agriculture, University of Peradeniya, Sri Lanka.

Project: Investigating organic carbon dynamics in two biochar-amended soils in Sri Lanka.

Teaching experience

- Senior Lecturer, Department of Soil Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka (15.07.2026 – to date).
- Temporary Lecturer, Department of Soil Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka (01.03.2017 – 20.06.2017).

Supervision of master's dissertations/ postgraduate internships

- Mr. P. Ehidihamhen (International Master of Science in Environmental Sanitation, Ghent University, Belgium).
- Ms. A. Ngambia (International Master of Science in Environmental Technology and Engineering, Ghent University, Belgium).
- Mr. T. Siddhartha (International Master of Science in Environmental Technology and Engineering, Ghent University, Belgium).
- Supervised four postgraduate internships at Agroscope and Ithaka Institute, Switzerland.

Awards, medals,

- Prof. F.S.C.P. Kalpage gold medal for the academic excellence in soil science, University of Peradeniya, Sri Lanka (2016).
 - S.F.H. Perera Memorial Prize for the greatest competence at the 4000 series (final year in B.Sc. examination), University of Peradeniya, Sri Lanka (2016).
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**scholarships,
and prizes**

- University scholarship for the best performance at the 1000 series (first year in B.Sc.) examination, University of Peradeniya, Sri Lanka (2013).
- Scholarship from the European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie grant agreement No 72199, Project title: Advanced Carbon Materials from Biowaste: Sustainable pathways to Drive innovative Green Technologies, Project period: 11/07/2017 to 11/07/2020 at Ghent University, Belgium.
- Fellowship from the regional and community funding: special research fund (code: 01IT0120), Ghent University, Belgium, Project title: Use of biomass-derived carbons (BCs) and BC-derived products for soil amendment and in soilless growing media, Project period: 12/07.2020 to 11/01/2021, (total value of € 25,000).
- Commission of scientific research (CWO) mobility grant from Ghent University, Belgium, for participation in IBI Biochar World Congress (Seoul, South Korea, 2019), (total value of € 1000).

**Research
publications****Scientific publications (by August 2026)****Articles in international journals with peer review**

- **Rathnayake, D.**, Schmidt, H. P., Leifeld, J., Bürge, D., Bucheli, T. D., & Hagemann, N. (2024). Quantifying soil organic carbon after biochar application: how to avoid (the risk of) counting CDR twice? *Frontiers in Climate*, 6, 1343516. <https://doi.org/10.3389/fclim.2024.1343516>.
- Grafmüller, J., **Rathnayake, D.**, Hagemann, N., Bucheli, T. D., & Schmidt, H. P. (2024). Biochars from chlorine-rich feedstock are low in polychlorinated dioxins, furans and biphenyls. *Journal of Analytical and Applied Pyrolysis*, 183, 106764. <https://doi.org/10.1016/j.jaap.2024.106764>
- **Rathnayake D.**, Schmidt H.P., Leifeld J., Mayer J., Epper C.A., Bucheli T.D., Hagemann N., (2023) Biochar from animal manure: a critical assessment on technical feasibility, economic viability and ecological impact, *GCB Bioenergy: Bioproducts for a Sustainable Bioeconomy*. <http://doi.org/10.1111/gcbb.13082>.
- Ghysels, S., **Rathnayake, D.**, Maziarka, P., Mašek, O., Sohi, S., & Ronsse, F. (2022). Biochar stability scores from analytical pyrolysis (Py-GC-MS). *Journal of Analytical and Applied Pyrolysis*, 161, 105412. <https://doi.org/10.1016/j.jaap.2021.105412>.
- **Rathnayake, D.**, Creber, H., Van Poucke, R., Sohi, S., Meers, E., Mašek, O., & Ronsse, F. (2021). Biochar from sawmill residues: characterization and evaluation for its potential use in the horticultural growing media. *Biochar*, 3, 201-212. <https://doi.org/10.1007/s42773-021-00092-4>.
- **Rathnayake, D.**, Ehidihamhen, P. O., Egene, C. E., Stevens, C. V., Meers, E., Mašek, O., & Ronsse, F. (2021). Investigation of biomass and agricultural plastic co-pyrolysis: effect on biochar yield and properties. *Journal of Analytical and Applied Pyrolysis*, 155, 105029. <https://doi.org/10.1016/j.jaap.2021.105029>.
- **Rathnayake, D.**, Rego, F., Van Poucke, R., Bridgwater, A. V., Mašek, O., Meers, E., ... & Ronsse, F. (2021). Chemical stabilization of Cd-contaminated soil using

fresh and aged wheat straw biochar. *Environmental Science and Pollution Research*, 28, 10155-10166. <https://doi.org/10.1007/s11356-020-11574-6>.

- **Rathnayake, D.**, Maziarka, P., Ghysels, S., Mašek, O., Sohi, S., & Ronsse, F. (2020). How to trace back an unknown production temperature of biochar from chemical characterization methods in a feedstock-independent way. *Journal of Analytical and Applied Pyrolysis*, 151, 104926. <https://doi.org/10.1016/j.jaap.2020.104926>.

Articles in preparation

- **Rathnayake, D.**, Leifeld, J., Steiner, S.K., Banfield, C.C., Guillaume, T. , Soil organic matter molecular composition, diversity, and origin guided by long-term application of organic amendments and nitrogen fertilization levels (Under review).
- **Rathnayake, D.**, Kotany, K., Guillaume, T., Dippold, M., Banfield, C.C., Leifeld, J., Comparison of soil organic matter molecular markers identified through direct pyrolysis GC-MS analysis, amino sugar analysis, and plant lipid analysis (Under review).
- **Rathnayake, D.**, Leifeld, J., Preferential sorption of organic compounds onto biochar produced at different temperatures after incubating with compost.
- **Rathnayake, D.**, Dharmakeerthi R. S., Dandeniya W. S., Effects of biochar produced from top-lit updraft and retort methods on organic carbon mineralization in two contrasting tropical soils.
- **Rathnayake, D.**, Leifeld, J, Bucheli, T, Schmidt, H.P., Hagemann, N, Biochar production from plastic mixed biomass: Polymer-specific impact on biochar yield, properties, and agronomic performance.

Book chapters

- **Rathnayake, D.**, and Ronsse, F., 2019. “An Overview of the Methods Use in the Assessment of Biochar Carbon Stability.” In *Advanced Carbon Materials from Biomass: An Overview*, edited by Joan J Manyà, 135–146. Green Carbon Project and Consortium. <https://zenodo.org/records/3233733>. Published May 28, 2019.

Selected proceedings of scientific conferences and/or symposia-oral presentations

- **Rathnayake, D.**, Steiner, S. K., Leifeld, J., and Guillaume, T.: Long-term impact of organic amendments on soil organic matter molecular composition, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025.
- Steiner, S., Keiluweit, M., Oberson, A., **Rathnayake, D.**, and Guillaume, T.: Nitrogen use efficiency of agroecosystems along a gradient of organic matter quality and quantity using stable nitrogen isotope tracing, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025.
- Dharmakeerthi R.S., **Chathurika R.M.D.**, and Dandeniya W.S., “Effect of the application of differently produced biochar on CO₂ emissions from Sri Lankan soils”, Sustainable land and water management symposium, Sri Lanka, 2019.

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- **Rathnayake D**, Tolu J, Kägi R, Koestel J, Leifeld J, Bucheli T, Schmidt H.P., Hagemann N, “Potential of pyrolysis to valorize biogenic secondary materials contaminated with plastics”, Microplastics-CH IV Meeting, Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland, March 24th, 2023.
 - **Rathnayake D**, Bucheli T, Schmidt H.P., Hagemann N, “Effect of different waste plastics on biochar quality: Indications and limits for recycling by co-pyrolysis”, 3rd PhD - Postdoc Symposium, Agroscope, Switzerland, 13th October 2022.
 - **Rathnayake D.**, Masek O., Ronsse F., “Biochar as a growing medium constituent and a peat substitute”, 32nd annual PGIA congress, University of Peradeniya, Sri Lanka, 19th November 2020.
 - Mašek O., Wurzer, C., **Rathnayake D.**, Ronsse, F., “Biochar in Circular Economy: Challenges and Opportunities in Producing Biochar from Plastic Contaminated Biomass”, The Australian Circular Economy Conference, Australia, 7-11th December 2020.
 - **Rathnayake D.**, Mašek O., Ronsse F., “Suitability of biochar produced from co-pyrolysis of spent growing media and plastic grow bags in environmental applications”, Pyro 2020, Ghent, Belgium, 2020.

Selected proceedings of scientific conferences and/or symposia-poster presentations

- **Rathnayake D**, Steiner S.K., Guillaume T, Leifeld J, “Molecular and bioenergetic signatures in mineral-associated and particulate organic matter fractions under long-term field experimental conditions”, International conference of Soil Systems and Ecology, Berlin, Germany, 2024.
- **Chathurika R.M.D.**, Dandeniya W.S., Dharmakeerthi R.S., “Organic carbon dynamics in two biochar amended soils in Sri Lanka”, Faculty of Agriculture Undergraduate Research Symposium (FAuRS), University of Peradeniya, Sri Lanka, 2016.
- **Rathnayake D.C**, Dandeniya W. S, Dharmakeerthi R.S., “Corn cob waste biochar amendment to two contrasting soils in Sri Lanka: effect on C mineralization and biological soil properties”, Wageningen soil conference, Wageningen University, Netherlands, 2019.
- **Rathnayake D.**, Rego F., Van Poucke R., Meers E., Ronsse F., “Chemical stabilization of Cd contaminated soil using fresh and aged wheat straw biochar”, Bio-Char II: Production, Characterization and Applications, Cetraro Calabria, Italy, September 15-20, 2019.
- **Rathnayake D**, Tolu J, Kägi R, Koestel J, Leifeld J, Bucheli T, Schmidt H.P., Hagemann N, “Potential of pyrolysis to valorize biogenic secondary materials contaminated with plastics”, Swiss Biochar association meeting, Switzerland, 16th June 2023.
- **Rathnayake D.**, Maziarka P., Ghysels S., Sohi S., Mašek O., Ronsse F., “Practical assessment of biochar stability indicators: sensitivity to feedstock type and production conditions”, Bio-Char II: Production, Characterization and Applications, Cetraro Calabria, Italy, September 15-20, 2019.

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- **Rathnayake D.**, Ronsse F., Mašek O., “Analytical pyrolysis of biochar to predict the stability of biochar”, 14th International Conference on Renewable Resources and Biorefineries, Ghent University, Ghent, Belgium, 2018.
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Other activities, participations, and trainings

- Successfully completed soil biology and biogeochemistry lab skills course for assessing soil functions, Wageningen University and Research, Netherlands, 13-17th May 2019.
 - Participation in the workshop regarding teamwork and project management held at Stockholm University, Sweden, 2017.
 - Participation in the research school regarding the applications of biochar-derived materials at Queen Mary University, London, UK, 2017.
 - Participation in the research school regarding refining of biomass-derived carbon held at the Department of Materials and Environmental Chemistry, Stockholm University, Sweden, 2017.
 - Participation in the workshop regarding personal and outreach skills development at Queen Mary University, London, UK, 2017.
 - Successfully completed the masterclass on soil fertilization with micronutrients and inspiring practical tests with chelates to prove their function, Wageningen University and Research, Netherlands, 2019.
 - Successfully completed the masterclass on sources, occurrence, and risks of microplastics in the terrestrial ecosystems, Wageningen University and Research, Netherlands, 2019.
 - Successfully completed the qPCR course organized by Biogazelle, Belgium, 2019.
 - Successfully completed the academic posters course organized by Ghent University, Belgium, 2018.
 - Successfully completed the fostering responsible conduct of research course organized by Ghent University, Belgium, 2017.
 - Successfully completed the introduction to R course organized by Ghent University, Belgium, 2018.
 - Successfully completed the optimizing cooperation in international research groups course organized by Ghent University, Belgium, 2018.
 - Successfully completed the GIS workshop organized by the Department of Soil Science, University of Peradeniya, Sri Lanka, 2015.
 - Editor, Soil Science Society of Faculty of Agriculture, University of Peradeniya, Sri Lanka (2015-2016).
 - Compere, Faculty of Agriculture, University of Peradeniya, Sri Lanka (2015-2016).
 - Runners-up, Hockey Women’s Championship, Inter Faculty Freshers Championship, University of Peradeniya, Sri Lanka (2014).
 - Successfully organized open laboratory days for the public at the Department of Green Chemistry and Technology for the post-graduate students in the Faculty of Bioscience Engineering, Ghent University, Belgium (in 2017, 2018, and 2019).
 - Member of the Soil Science Society of Sri Lanka (2015 to date), and European Geoscience Union (2025-2026)
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- Committee member of the PGIA students' association (2017).
 - Reviewer for the following journals: Soil and Tillage Research, Biomass Conversion and Biorefinery, Tropical Agricultural Research, and Environmental Science and Pollution Research.
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**Instrument
handling and
maintenance**

- Elemental analyzer (for CNHO), Simultaneous Thermal Analysis (TGA+DSC+EGA), Pyrolysis GC-MS, FT-IR, and Computed Tomography (CT).
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Referees

- Dr. Jens Leifeld, Climate and Agriculture research group, Agroscope, Federal Department of Economic Affairs, Education and Research, Switzerland.
Email: jens.leifeld@agroscope.admin.ch
 - Prof. Frederik Ronsse, Department of Green Chemistry and Technology, Faculty of Bioscience Engineering, Ghent University, Belgium
Email: Frederik.Ronsse@Ugent.be
 - Prof. Saman Dharmakeerthi, Department of Soil Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka.
Email: dharmakeerthirs@agri.pdn.ac.lk.
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Declaration

I do hereby declare that the above particulars of information and facts stated are true, correct, and complete to the best of my knowledge and belief.

Date: 01/08/2026

Dilani Rathnayake.
